EVERGREENS: THEIR USES AND CULTURE.

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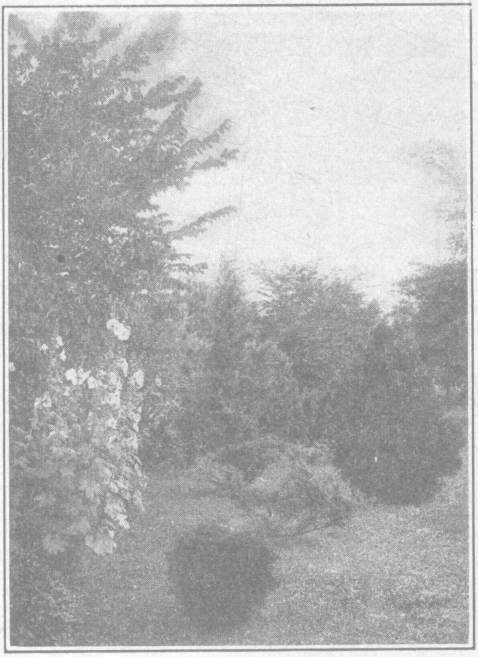

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The Bulletins of this Station are issued at irregular intervals. They are paged consecutively and an index is included with the Annual Report, which constitutes the final number of each yearly volume.

INTRODUCTION.

The law establishing a department of forestry at this Station, passed March 17, 1906, makes it the duty of the Station, in addition to conducting inquiries into the forest conditions of the state and publishing the results of such inquiries, "to determine by experiment and investigation the kinds of trees and shrubs best suited to the various situations for windbreaks and shelter, for beautifying grounds, and the best methods of planting and managing the same." The present bulletin has been prepared in obedience to this section of the law.

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BULLETIN

OF THE

Ohio Agricultural Experiment Station

NUMBER 190. FEBRUARY, 1908.

EVERGREENS: THEIR USES AND CULTURE.

BY W. J. GREEN AND W. EMERSON BONTRAGER.

Evergreens are of peculiar value both for shelter and ornament. At all times they furnish a barrier to wind and cold, and the remarkably picturesque forms assumed by the adult specimens of many species add much to the attractiveness of a country home, especially when their boughs gracefully bend beneath a load of snow. In winter, when other trees are destitute of foliage, these majestic trees lend to the scene an air of animation which mitigates in a large measure the severity and desolation of the season. If tastefully intermingled with other trees and shrubs about the home they give a warmth of verdure and variety of outline unattainable without their use. That many of the evergreens can be successfully grown upon thin sandy soils is an additional argument in their favor.

Where grown to show the characteristic beauty of individual trees, evergreens should be grouped naturally and not so closely as to crowd upon each other, usually along the sides or at the rear of the lawn. Planting in straight lines should be avoided, and, in small groups, the disposition of trees in odd numbers is to be preferred. Immediate effects may be secured by planting thickly, but thinning should not be so long deferred as to work injury to the lower branches of those trees which it is intended to grow to maturity. The individual who expects to begin the planting of evergreens should not underestimate the importance of ascertaining what species and varieties have been found vigorous and hardy after being tested over a wide range of country under dissimilar conditions. After a beginning has been made, specimens may be added from time to time as the planter determines what kinds are best suited to his needs and locality.

Probably the most valuable of all the evergreens in producing landscape pictures is the silver or white fir. Somewhat similar in color, although of a distinctly different habit of growth, is the Colorado blue spruce, which should be found in every collection. This superb tree is of iron-clad hardiness and the foliage is of a pronounced shade of blue which renders it very effective when grown in proximity to darker-colored kinds. The retinosporas, or Japan cypresses, are an extensive group of elegant small trees especially adapted to massing and also to use upon small lawns, while the dwarf Mugho pine will be found serviceable where one of low spreading habit is desired. At times in grouping trees a specimen of upright, columnar habit will be admissable, when the pyramidal arborvitae or Irish Juniper may be appropriately introduced; but a preponderance of such trees should be avoided, as it conduces to anything but a natural, graceful landscape composition. Who has not witnessed, in some rural cemetery, the spectacle of numerous stiff, erect Irish junipers which served only to deepen rather than dispel the depressing effect that is often felt in many of the smaller resting places for the dead? Likewise, an occasional specimen of the grotesque weeping spruce will add variety, but all trees of such abnormal type would best be used sparingly.

Photo by Waid.

FIG. 1—A good group of evergreens. At the rear are shown White, Austrian and Scotch Pines, with a Cut-leaf Weeping Birch to the right. In the foreground appear Colorado Blue Spruce, Arborvitaes and Red-twigged Dogwood.

The dismal funereal sensation sometimes experienced upon entering grounds where somber, suggestive trees, like the Norway spruce and Irish juniper, have been planted too profusely may be avoided by the use of such light, cheerful trees as the silver firs, Colorado

blue spruce, hemlock and retinosporas. A mingling of deciduous trees will also be helpful in counteracting any tendency to dull or gloomy effects. The white birch is admirably suited to this style of planting, and, when interspersed among evergreens, its snowy bark gleaming against a background of green boughs becomes a charming part of the Winter scene. The beauty of home grounds would be greatly augmented by the more general use of this handsome, hardy and easily-grown tree, which is so attractive a feature in much of Nature's grouping. Excellent enlivening effects may also be secured by using the red-twigged dogwood, a shrub some five feet high, whose numerous, wine-colored branches contrast finely with evergreens or snow. Owing to its small size this must be grown in front of taller trees, or in nooks such as frequently occur along the edges of an evergreen group. As a companion plant to the dwarf dogwood the golden willow is sometimes used, thereby throwing golden twigs into contrast with those of a crimson hue.

FIG. 11—Hollyhocks and White Pine. *Photo by Ballou.*

The foliage of the golden elder, a hardy, rugged shrub of the very easiest culture, will be of material value during the summer months. This must be planted in full exposure to the sunlight, as the rich yellow foliage becomes greenish in color when grown in partial shade. The coloring of this shrub is finest on young growth, hence it is well to cut back the plant severely in spring. Still another shrub useful

for such purposes is the red-bud or Judas tree, whose flowers, in a cheery shade of pink, cover the branches before the leaves appear.

At the base of evergreens occasional touches of color, such as are afforded by beds of petunia, canna, salvia or other bedding plants, are highly effective and satisfactory. Owing to their vigor of growth and ease of culture clumps of many of the perennial plants are exceedingly valuable adjuncts used in this way, and, if left undisturbed, they will increase in size and beauty from year to year. Foxglove, platycodon, hardy phlox, larkspur and a host of others, from which selection may be made according to the planter's fancy, are available for the purpose. In fact, evergreens form a most excellent background for a great variety of charming hues in flower, fruit and foliage. During the entire cycle of the seasons they may be made to accentuate and brighten an infinite variety of colors in plants, from the humblest flowers to the gorgeous maples.

Photo by Waid.

FIG. III—Arborvitaes, Japan Cypress and Irish Juniper grouped against deciduous shrubs and trees.

WINDBREAKS, SHELTER BELTS AND SCREENS.

Every country home should have its shelter belt of evergreens. Windbreaks are not meant for the sole use of extensive orchardists, as was once thought, but should be so commonly planted as to protect every home exposed in the least to the ravages of wind and storm. The saving in fuel alone will defray the cost of planting material in a few years' time. Nor need one wait a dozen years or even half so long for evergreens to grow large enough to afford a protection against piercing winds. Results may be secured in a comparatively short time by planting quite thickly, the superfluous trees to be removed from time to time as they encroach upon those

which it is designed to leave for the permanent shelter. Many an exposed barnyard or poultry run might be transformed into a place of genuine comfort for its inmates on wintry days, by planting along its northern and western sides a row of white pine, Norway spruce or arborvitae. Frequently, a barn which has been located too near the dwelling, a number of outbuildings or an unsightly view, may be concealed by the suitable location of a group of evergreens, and in many instances this bit of planting will perform the double function of screen and windbreak. A strip approximately ten times its height is protected by a windbreak, as is shown by the snow lying smooth on the ground for this distance beyond it after a storm.

FIG. IV—A White Pine Windbreak. Trees are fifteen years old. *Photo by Waid*

Often a windbreak can be worked into the general landscape effect to break up the monotony. This is done by informal grouping and combining different shades of color. Thus an irregular shelter belt of evergreens becomes, with maples, birches and other trees, a charming addition to the landscape. Its graceful outlines are far more charming than the formal and stiff appearance of the straight-row windbreak of a single species.

Since evergreens are a favorite place for the nesting of birds, an increase in the number of our little feathered friends will be observed wherever windbreaks are established. This is no small incentive for planting, whether viewed from the aspect of sentiment or that of economic advantage. The birds will many times compensate for the consumption of fruit and grain by the destruction of pernicious insects which are becoming more and more a menance to the farmer and fruit-grower.

For screens, to hide unsightly objects, or to secure a degree of privacy to the home, evergreens, because of persistent foliage, serve the purpose at all seasons. Used for this purpose they may be planted in straight or curved rows, to suit the boundaries, or in almost any manner, so that the purpose sought is realized. Very often, where a row of trees may be essential, in order to make a serviceable screen, the object can be quite as well attained by grouping and by mingling harmonious deciduous trees with evergreens. For a formal screen a dwarf or half-dwarf species is best, but by shearing, or close clipping, even such tall growing trees as Norway spruce can be used. The hemlock is admirable for the purpose and there are a number of species and varieties of arborvitae, retinospora and juniper which are good.

An evergreen hedge is but a closely clipped screen and the same species can be used for both. A screen needs some pruning to prevent openings and to keep the trees in somewhat symmetrical form, but a hedge should be clipped once or twice each year, the first early and the second time in midseason. Arborvitae, retinosporas and junipers bear clipping or shearing best of all, but spruces, firs and even pines are quite tractable under the knife early in summer before the new buds are fully formed, provided the young growth only is cut.

An evergreen hedge should always be kept wider at the base than at the top, otherwise those portions of the foliage which receive insufficient light perish and unsightly dead spots appear. It is useless to attempt to start an evergreen hedge in the shade of trees. If one is in doubt as to the propriety of planting an evergreen hedge, a safe rule is not to locate one where it is not actually needed.

PLANTING AND CULTURE.

Probably best results will be secured by transplanting evergreens in May, just as the buds are beginning to swell. A rainy time in September is also good. The size of holes will depend upon the size of the tree to be planted, and they should be large enough to hold the clump of roots without crowding. If it occur in digging that

the surface soil is of better quality than that found further down, as frequently happens, put a small quantity of this to one side and replace it in the hole before the tree is inserted. After adjusting the roots in the hole as nearly as possible in the position which they formerly occupied, fill the earth in gently and thoroughly about them, finally firming it well. When the hole has been half filled a thorough watering will make success doubly certain. As a finishing process, after filling the hole and firming the soil well about the tree, apply as a mulch six or eight inches of straw, coarse manure or grass. Too much emphasis can scarcely be placed upon the importance of this last step. In digging evergreens take special care to avoid injury to the roots. With deciduous trees it is possible to preserve a balance between top and roots by cutting back the former if the latter be injured, but this is not practicable in dealing with evergreens. To protect the roots against drying by exposure to sun and wind they must be carefully wrapped in a wet sack, piece of burlap or old cloth, even if being moved for only a short distance. If the soil be markedly deficient in fertility the trees will be benefitted by having thoroughly rotted manure spaded into the earth about them, but this must not come into direct contact with the roots and fresh manure ought never to be used. If evergreens are transplanted several times in the nursery, as they should be, most kinds, except pines and some of the firs, will form a mass of roots to which the soil will adhere in digging. If a ball of earth is carried along in the final transplanting, and other precautions taken, not a single tree will be lost.

AUGUST PLANTING.

It is possible to transplant evergreens successfully during a wet spell in August and up to the middle of September. However, this period is suited only to the shifting of trees from one part of the home grounds to another or to the planting of those secured in the vicinity, as evergreens cannot safely be shipped long distances at this time of the year, owing to danger from heating in the packages. Spring seems to be the natural and logical time for the removal of such trees, hence it is likely that the average planter will only resort to summer and autumn planting in exceptional cases.

PRUNING.

The pruning of evergreens is not often required, being necessary only to preserve the symmetrical shape of the tree or for the removal of diseased, dead or dying branches. Dead limbs may be cut at any time, but pruning of pines, spruces and firs should be done during the growing season, when the young wood is still soft,

as a number of new buds will then be formed at the end of the branch. Arborvitaes, Japan cypress and junipers may be shorn in spring and summer. No evergreens should be pruned in autumn. As most evergreens naturally assume a conical form, the encouragement of this by pinching back any branches inclined to make an over-vigorous growth is advisable and necessary. Such branches should be cut back to a strong bud, thus leaving a chance for the limb to begin growth again. It is gratifying to note that the once prevalent fashion of pruning evergreens into urns, fowls and other fantastic shapes seems to be dying out. Evergreens are often planted where they are to serve as partial, or open screens, the object being to afford some seclusion to a dwelling or building in a somewhat public place. In cases of this kind it is desirable to have a thick mass of foliage near the center of the tree while the outer portions are more open. This is accomplished by very close clipping when the trees are young and afterward allowing a natural growth. While this form of a tree is less picturesque than one where the pruning has been more moderate, it is allowable because it serves a definite purpose. With some species this treatment makes more lasting specimens than where no pruning is done.

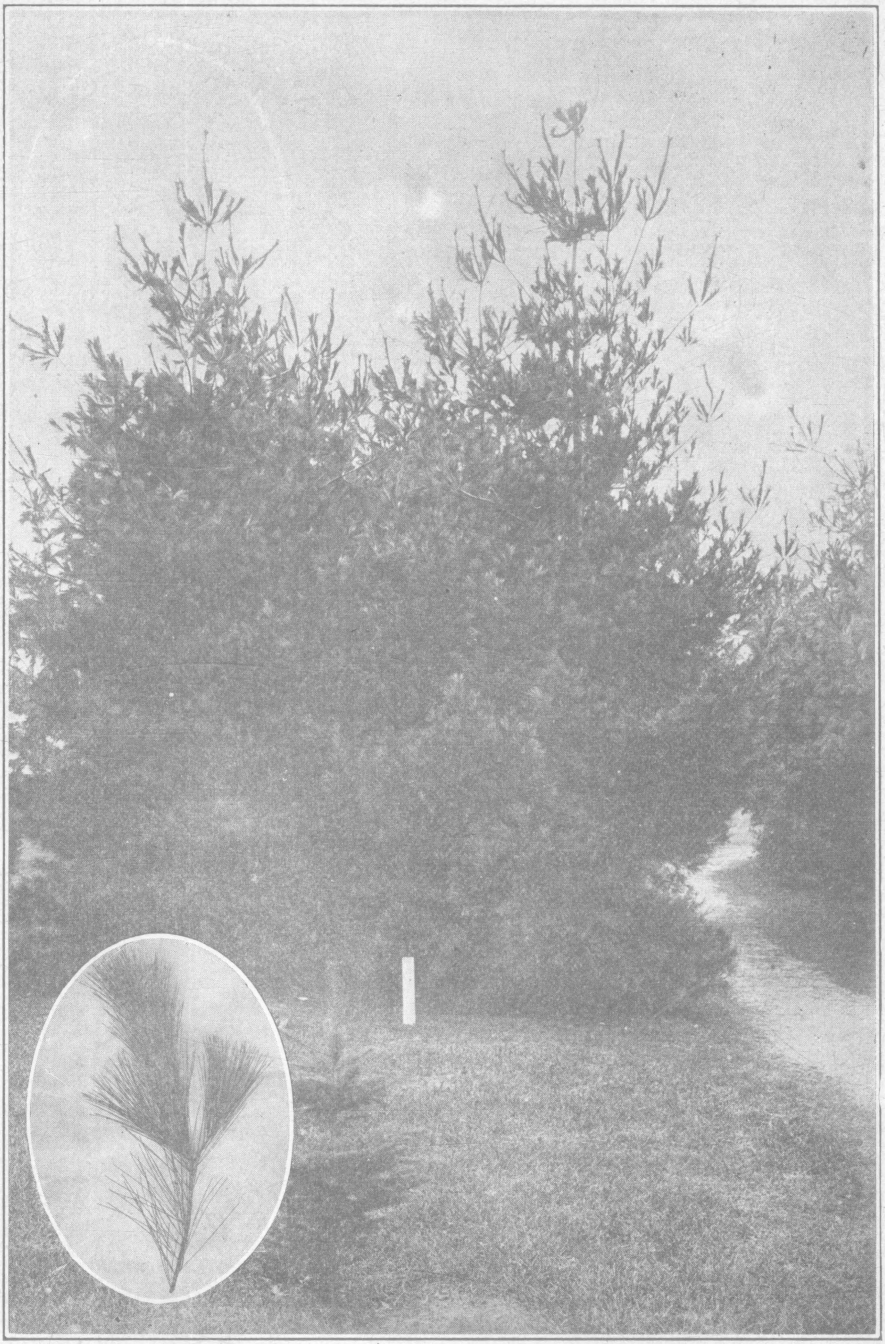

FIG. V—White Pine. *Pinus strobus Linn.* *Photo by Waid*

The Pine. *Pinus Linn.* The pines are found in most of the colder parts of the world, where they cover immense areas. Few trees will endure greater extremes of cold and the region of their natural habitat extends north to Greenland. They are so constituted as to flourish upon poor, gravelly or sandy soils, while their abundant and enduring foliage, in its various shades of green renders them of signal value in ornamental planting, whether used as shelter or screen, or as a background against which to group deciduous trees and shrubs.

White Pine. *Pinus strobus Linn.* As an ornamental tree the white pine is probably the most valuable of the group, since its color is more cheerful and its foliage more pliant and graceful than that of any other species. Unlike some of the other pines, the shape of the tree does not become rounding at the top with increasing years, but it permanently retains the form of a tapering shaft. Making a dense growth, it is of great value in the formation of plantings for shelter and protection. It is perhaps most graceful and beautiful when grown on thin, sandy soil, as the tree then assumes a dignified, stately, spire-like form sometimes 150 feet tall, while if reared on land abounding in fertility the head is much more dense. In rate of growth it is very rapid, hence of unusual value where speedy results are wanted, as in the case of windbreaks and open screens. The great white pine forests of North America are found in a belt extending across the northern part of the United States and southern Canada.

The Red Pine, sometimes called Norway pine (*Pinus resinosa Ait.*), so named on account of its attractive, bright red bark, is found native in New England and the region extending northward through Canada and westward to Wisconsin. The trees vary from 50 to 75 feet in height and the wood is very rich in resinous matter, being only excelled in this regard by that of the pitch pine. Its habit of growth is peculiar in that the needles are borne in thick tufts on the ends of the branches. These needles are long and of a dark green color and, as they contrast well with the reddish bark, the tree is not an unattractive one. While not of as great value from the ornamental standpoint as some of the other pines, its distinctive habit of growth and hardiness entitle it to a place in collections.

Western Yellow Pine. *Pinus ponderosa Dougl.* This species is found in river valleys and on the lower mountain slopes along the Pacific coast, being common in Oregon, where it often attains a height of one hundred feet with a greater part of the trunk free from branches. It resembles the Austrian pine in form, but is of a darker green and has long, glossy needles, which are borne in plume-like clusters, While the appearance of the young tree is quite attractive, the yellow pine will probably not be much used as an ornamental, on account of the coarse and open appearance presented by the mature specimen, although its vigor of growth and hardiness commend it for use in certain positions.

Austrian or Black Pine. *Pinus Austriaca Link.* This large speading species is found native in Austria and adjacent countries. It is one of the most widely planted kinds and its merits have made it a general favorite. It has a massive appearance and a symmetrical outline, due to its branches being placed equally distant apart around the trunk, and as it is of a rich, dark green color, it is very handsome as seen from a distance and harmonizes well with both white and Scotch pines. However, an intimate examination will disclose a coarseness which renders it unsuitable for planting near residences, although it makes a satisfactory specimen when located in some remote site upon the lawn. For use where an evergreen of strong, rapid growth, hardiness and adaptability to a great diversity of soils is desired, the Austrian pine is one of the best trees to be had. It is of exceptional value when used in shelter strips for protecting orchards and buildings. While it does not grow so rapidly when young as the Scotch pine, it lives to a greater age, and will succeed in a moister soil than is suited to most of the pines.

Scotch Pine. *Pinus sylvestris Linn.* The name of this species would indicate that it is of Scotch origin, but in reality it is found covering large areas in central Europe, where it is held in about the same esteem as the white pine here. It is much inferior to the white pine in all respects. The mature trees sometimes reach a height of 80 feet and are four or five feet in diameter. Its foliage is of a bluish color and the size of the tree precludes its use in small grounds, but in parks and upon extensive lawns it can be used to considerable advantage. Its rate of growth is exceedingly rapid, and this fact, together with its hardiness and the ease with which it can be grown upon many kinds of soil, make it of great service in the formation of windbreaks. It is handsome when young and often assumes picturesque forms in old age.

Swiss Stone Pine. *Pinus cembra Linn.* This one inhabits the higher regions of the Alps, specimens fifty feet tall being frequently found. It also abounds in Austria, where it forms vast forests of the darkest shade of green. In form the tree is conical, with branches borne well to the ground; while the foliage, which is very dense, has a peculiar tufted appearance. It produces attractive purple cones which are born at or near the apex of the tree. Unfortunately of very slow growth, the Swiss stone pine has great value in ornamental planting, as it is capable of producing effects not to be secured by the use of any other species. It will flourish upon thin, stony soil in exposed situations such as few other evergreens can endure, while its dark foliage contrasts well with that of lighter-colored species. A well-grown tree of Swiss stone pine is a fitting subject for any lawn, whether it be in the home grounds, cemetery or park.

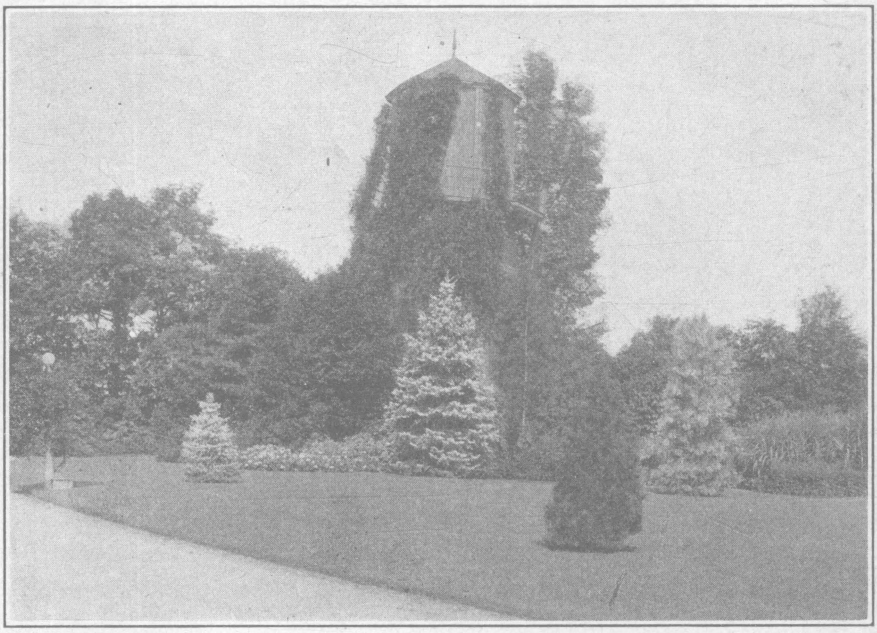

FIG. VI—Colorado Blue Spruce in center, Umbrella Pine in foreground

Umbrella Pine. *Sciadopitys verticellata Sieb. & Zucc.* This unique conifer, so-called from the fact that its leaves are arranged about the twig somewhat like the ribs of an umbrella, is a native of Japan. The foliage is dark-colored and rich looking. This tree seems to be of undoubted hardiness, and, while it

grows somewhat slowly when young, the rate of growth is more rapid in later years, so that trees twenty-five years old ought to be fifteen to twenty feet high. In Japan umbrella pines one hundred feet high are by no means uncommon, but trees of this size are undoubtedly very old. Where one wishes to cultivate on his lawn a rare evergreen of peculiar, yet attractive and satisfactory, habit of growth, no mistake will be made in securing a specimen of the umbrella pine.

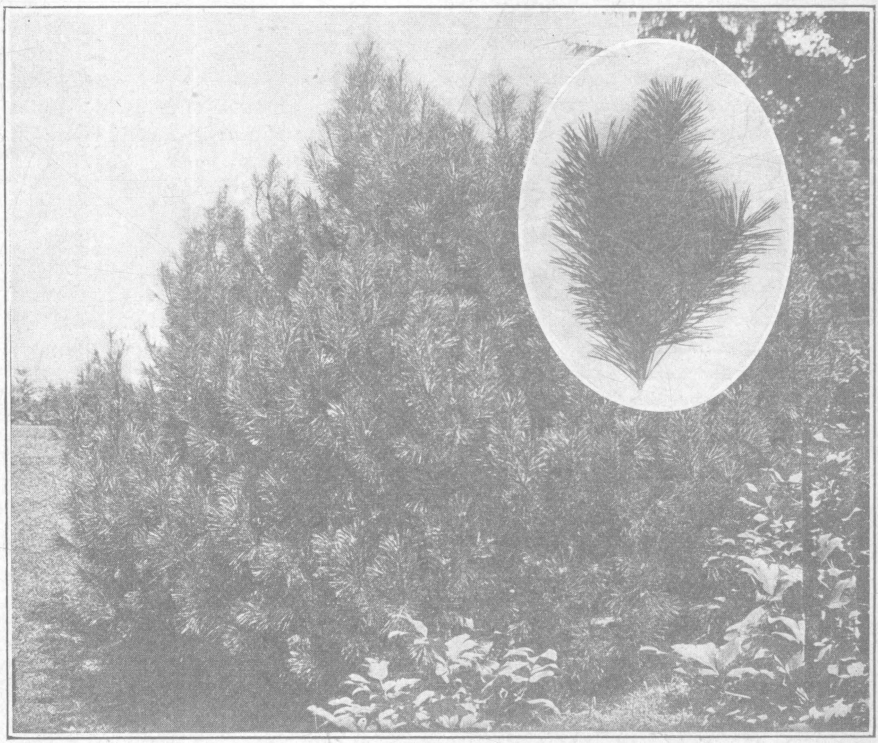

FIG. VII—Dwarf Mugho Pine. *Pinus pumilio Haenke.*

Dwarf Mugho Pine. *Pinus pumilio Haenke.* The Mugho pine is a low-growing species originally found upon the mountains of Central Europe. Specimens occasionally attain a height of twenty-five feet, but as generally seen it is a tree of low, sprawling character seldom more than five or six feet tall. Its peculiar spreading habit, together with dense, dark green foliage and assured hardiness, make it of great service in ornamental planting. It shows especially well when planted near to rocks or upon a rocky ledge, and individual trees are attractive on the lawn, if located well in the foreground or planted in front of taller evergreens.

Norway Spruce. *Picea excelsa Link.* In discussing the Norway spruce, which has been so abundantly and widely planted through the northern half of the United States, the authors feel that they are dealing with a tree already thoroughly well known to most readers. Owing to its rapidity of growth and

cheapness, consequent upon the ease with which it can be propagated from seed, together with the fact that it readily adapts itself to almost any soil, this species has been widely disseminated; and there is scarcely a park, cemetery or rural community where specimens of it cannot be found—many of them being in an advanced stage of dilapidation.

Weeping Norway Spruce. *Picea excelsa pendula Loud.* In this variety we have a unique member in the family of spruces, which embraces most of the characteristics of the Norway in addition to a strikingly peculiar habit of growth. Differing from the Norway, its limbs grow in a decidedly weeping fashion, while occasional branches turn up in a most eccentric manner. Being slender and much smaller than the Norway, it is one of the finest specimen trees. It should be located at a somewhat conspicuous spot on the lawn and is excellent for use in small grounds. While its growth is made rather slowly, the weeping spruce is entirely hardy and not in the least fastidious as to soil.

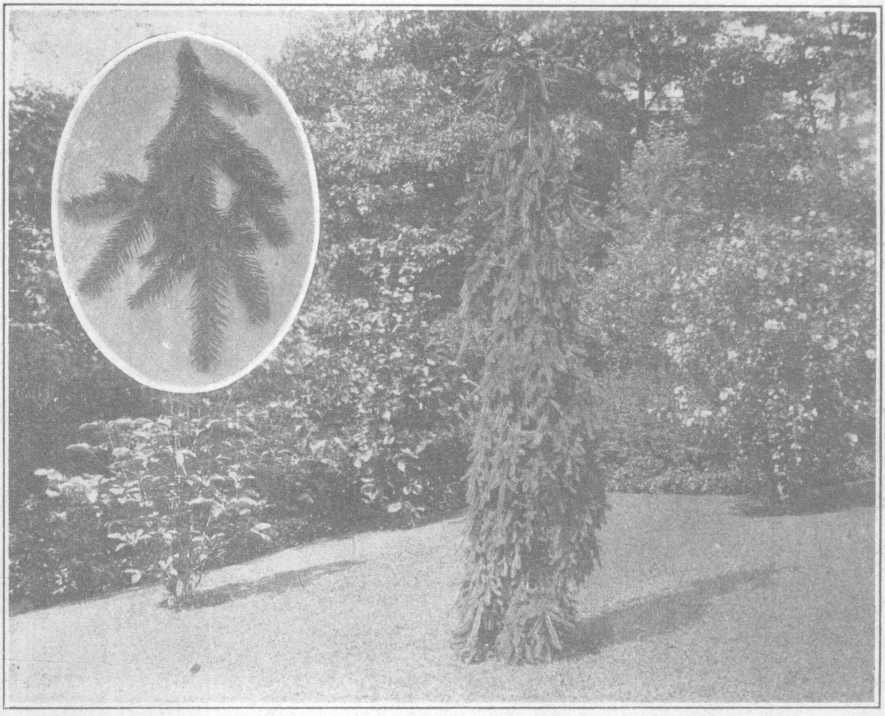

FIG. VIII—Weeping Norway Spruce. *Picea excelsa pendula Loud.*

The Norway spruce comes from central and northern Europe, where dense forests of it cover immense tracts of country and the old trees vary in height from eighty to one hundred and fifty feet. A natural forest of Norway, grown under favorable conditions, presents a sight long to be treasured in one's memory, since their long, pendulous, gracefully-curving branches, festooned with dark green, shining foliage, sweep the ground.

The Norway is of great value in ornamental planting, when used judiciously, but it is not suited to use on extremely small lawns nor to any situation where space cannot be afforded for it to develop normally. It is valuable for planting

in parks, cemeteries and upon spacious lawns, while its vigorous, rapid habit of growth specially commends it for any position were speedy results are wanted. It is also one of the good trees for making windbreaks, since its dense growth forms an almost impenetrable barrier to chilling winds and frosts that often destroy fruit and ornamental trees of doubtful hardiness. The Norway spruce stands shearing well and has been much used in the form of close hedges, for which purpose it has given good service.

Like many general favorites, the Norway spruce has its faults and there is no doubt that it has been planted too freely, to the exclusion of more valuable, though less generally known, species. At thirty-five years the Norway begins to get thin and ragged in the top, and a perfect tree more than fifty years old is seldom seen. It is one of the darkest-colored evergreens, and, when used in the formation of large belts or long avenues, if not brightened by the occasional use of some more cheerful tree, the general effect is monotonous and at times even exceedingly oppressive.

FIG. IX—Oriental Spruce. *Picea orientalis Carr.*

Oriental Spruce. *Picea Orientalis Carr.* A native of the regions surrounding the Black Sea and other parts of southwestern Asia, where it is abundant, the oriental spruce is one of the finest foreign evergreens that has ever been introduced into America. It is of slender, elegant and remarkably refined habit, its growth being made less rapidly than that of the Norway, which it resembles in color. The species is etirely hardy and produces a tree one hundred and twenty-

five feet tall, which retains the lower limbs for many years. As it makes its growth slowly it is well suited while young for use upon small lawns. The oriental spruce is one of the very best evergreens for any situation where a fine specimen is wanted; and, with the exception of its slower habit of growth, is in every way superior to the popular Norway for ornamental purposes.

White Spruce. *Picea Canadensis B. S. P.* Of the spruces native to America one of the most pleasing, on account of its conical shape and compact habit of growth, is the white spruce. Variously estimated at from fifty to one hundred and fifty feet in height, the white spruce bears foliage of a bluish-green color, which is unpleasantly aromatic when crushed. It has been much used as an ornamental, and when grown in a group with Norway spruce or other dark-colored trees the contrast formed is a lively and agreeable one, although the white spruce is longer lived and of slower growth than the Norway. It is a native of the north, as its natural range extends from northern New England through Canada to the Arctic Circle and westward through northern United States to Montana, and it is therefore well suited to cold regions. The white spruce does not stand heat well and in central United States the foliage is liable to be attacked in summer by the red spider, which soon causes it to look discolored and thin. For the construction of windbreaks in the extreme northern states no tree is superior to the white spruce.

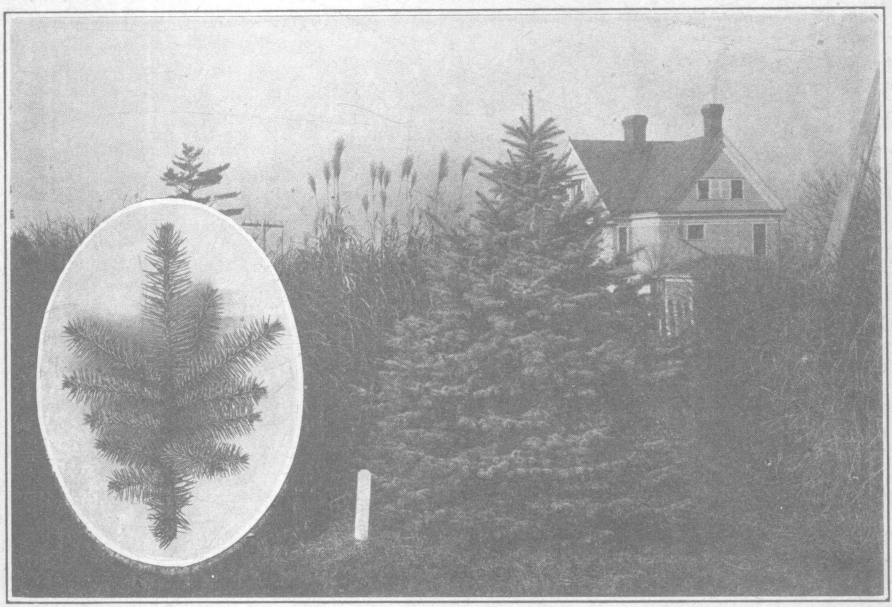

FIG. X—Colorado Blue Spruce. *Picea parryanna glauca.* *Photo by Waid.*

Colorado Blue Spruce. *Picea parryana glauca.* Too many good things can scarcely be said of this rarely beautiful conifer from the mountains of Colorado. While trees grown from seed vary greatly in shades of color, the finest have foliage of rich steel blue which is handsomest in summer and fall, becoming somewhat dimmer in winter. Nothing more attractive in the evergreen line can be easily imagined than the young growth on a well-colored Colorado blue

spruce, and a place should be found for at least one specimen on every lawn in Ohio. A tree of so unusual and striking a color as this should never be planted in masses, but instead used as a solitary specimen or in very small groups. When associated with other evergreens it would best be used sparingly, serving for accent as it were. The habit of this tree is to put out its branches, which are covered with erect, sharp-pointed needles, in a somewhat stiff, horizontal manner. Even in its native home the blue spruce does not retain the characteristic shade of blueness after it is forty years old, but that period of daily satisfaction and enjoyment will abundantly justify any one for planting it.

Koster's Blue Spruce. *Picea parryana glauca (forma) Kosteriana.* This is but the Colorado blue spruce grafted with wood from trees of the finest color, hence a prospective planter can make no mistake in purchasing the grafted sort, although they are slightly more expensive.

Weeping Blue Spruce. *Picea parryana glauca-pendula (forma) Kosteriana.* In this variety we have combined the gracefully pendulous habit of the weeping Norway spruce and the highly colored foliage of the colorado blue, the result being a weeping tree of even greater worth than the weeping Norway.

Engelmann's Spruce. *Picea Engelmanni Engelm.* Engelmann's spruce is another good tree which has come to us from the Rocky Mountains. The foliage of this species is ill-smelling and has some of the blue tints of the Colorado blue, but the needles are softer and much more pliant, the sharp, piercing character being wholly lacking. It is entirely hardy and attains a height at maturity ranging from one hundred to one hundred and fifty feet. While it has not been extensively planted in Ohio it seems to be a desirable and promising species and worthy of much more general use. Engelmann's spruce is not a rapid grower.

American Hemlock (*Tsuga Canadensis Carr*), considered by many to be one of the most beautiful evergreens, is native to a region extending from Nova Scotia to Wisconsin and along the Appalachian mountains from North Carolina northward through Canada. In Canada and northern United States vast forests of hemlock are found, the trees seeming to stand the conditions of a northern region better than the heat and drought of a more southerly locality. It often becomes a tree 70 to 80 feet in height and solitary specimens hold their branches well to the ground, but as often found in forests a large portion of the trunk is bare For ornamental and decorative purposes the hemlock has been much used and the grace with which it carries its light, feathery, drooping branches makes it indispensable. The tree is a symmetrical one, without rigid formality, clad in foliage of dark, yet lively and cheerful, shade of green. While seen at its best when grown as an individual specimen, the hemlock also harmonizes well with other trees. It bears shearing well and has been much used in the formation of hedges, a good hemlock hedge being unsurpassed in beauty by that of any other evergreen.

Douglas Fir. *Pseudotsuga taxifolia (Lamb.) Britt.* By some this is also called Douglas spruce. This important timber tree grows along the Pacific coast from Mexico through the Rocky Mountain Region to southern Canada, being found at its greatest perfection in the territory around Puget Sound, where trees three hundred feet in diameter are not uncommon. As an ornamental it is a dark-colored, very rich looking tree of graceful habit, and it is being used extensively in forestry on account of its rapid rate of growth and hardiness. Owing to its extremely large size it should be planted where it may ultimately have unrestricted space in which to grow.

FIG. XI—Douglas Fir. *Pseudotsuga taxifolia* (*Lamb*) *Britt.* *Photo by Waid*

FIG. XII—White or Silver Fir. *Abies concolor Lindl. & Gord.* *Photo by Waid*

White or Silver Fir. *Abies concolor Lindl. & Gord.* In this excellent conifer from the Rocky mountains it is believed we have the ornamental evergreen of the future. In every way a fitting companion for the Colorado blue spruce, it is superior in that the tree retains the distinctive, silvery hue of the foliage to a very great age. Of undoubted hardiness and adaptability to a wide variety of soils, the enduring qualities of this tree commend it for very general planting. Unexcelled as a specimen tree, it may also be used in small groups or in conjunction with other species, notably pines and spruces, when it should be used occasionally in the foreground. As the silver fir finally becomes a towering monarch one hundred and fifty feet tall, ample space for development should be apportioned to it.

Nordmann's Fir. *Abies Nordmanniana Spach.* From southwestern Asia, Nordmann's fir has been more generally planted through the eastern states than any other foreign species. While it has given satisfaction in many localities in the east, on the grounds of the Experiment Station it seems to be of doubtful hardiness and is therefore not recommended for general planting, unless in well-sheltered situations. Its foliage is of a dark, shining green above and a silvery shade below. Trees one hundred and twenty-five to one hundred and fifty feet tall are frequently found in the regions of which it is a native.

American Arborvitae, also called White Cedar. *Thuya occidentalis Linn.* The flat compressed foliage of the American arborvitae, which consists of numerous scales overlapping each other, effectually distinguishes the tree from any other conifer. It is found in that portion of the North American continent extending from the latitude of Pennsylvania northward, where it often grows in swamps, near the base of mountains, or in moist valleys between them. At maturity it becomes a neat-looking slender cone, ranging from twenty-five to fifty feet in height, with branches well retained to the ground. It is one of the very best evergreens for use on lawns and lots of small size, although its extremely formal, artificial shape militates against its being associated promiscuously with other evergreens. The dull, brownish, unattractive color assumed by the foliage in winter is the chief objection to the arborvitae, although its color is remarkably bright and fresh-looking during the summer and fall months. There is no evergreen, either native or introduced, which will endure as much hardship and grow on as great a variety of soils, under even adverse conditions, as the arborvitae.

Owing to its regular habit of growth and the impunity with which it stands the pruning shears, the arborvitae has become the most popular from its extensive use in hedges and screens, for which purpose it has no superior. When it is intended to make a hedge the ground should be thoroughly dug up or cultivated and the trees planted two or three feet apart. After planting a mulch will aid greatly in retaining a moisture in the soil and is essential, for the first season at least.

The marked proclivity of the arborvitae to sport has resulted in the production of many named varieties, one of the very best of which is the Siberian Arborvitae (*Thuya Sibirica Hort.*), a variety superior, indeed, to the species itself. The Siberian has dense foliage of a darker shade of green than that of the American and in form the tree is also conical but wider at the base and sloping less steeply to the apex. It retains its color in winter much better than the American, and is an elegant specimen tree of the greatest hardiness for any situation where a very formal tree is appropriate. While it has not been so

much used in the formation of hedges as has the American, it is excellent for the purpose and a smoothly shorn hedge of Siberian arborvitae is a satisfying sight. The popularity of this variety is growing and no mistake will be made in planting it freely.

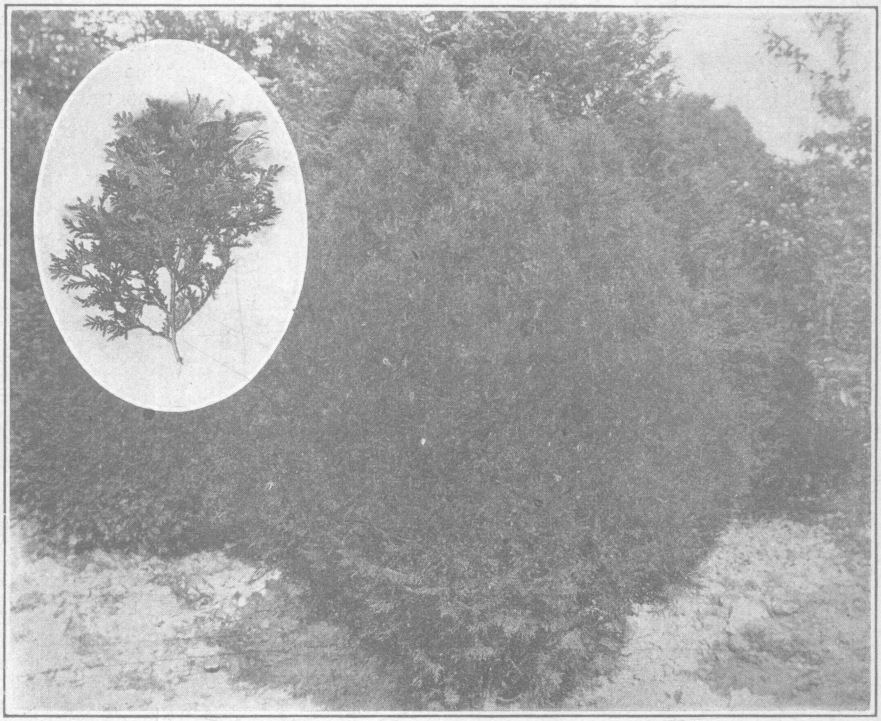

FIG. XIII—Siberian Arborvitae. *Thuya Siberica Hort.*

Geo. Peabody Arborvitae. *Thuya occidentalis var. Geo. Peabody.* In this variety we have a tree similar in form and general character to the American arborvitae, clad in foliage of clear and enduring golden yellow. As with all trees of striking and unusual shades of color, this variety should be used with discretion and only as a sort of spice to brighten a mass or bed of evergreens in darker colors. It is a handsome specimen tree and of value where space is limited.

Globe-Headed Arborvitae. *Thuya occidentalis Globosa.* A variety of dwarf and very dense growth with spherical or globular form, two or three feet in diameter. As an aid in forming the typical shape, the shears may be applied to this tree two or three times in a season.

Hovey's Golden Arborvitae. *Thuya occidentalis Hoveyi.* This variety is of very dense and compact, yet not severely formal, habit, the head of the tree being oval-globular in shape, The color of the foliage is a beautiful, fresh-looking shade of light golden green. It grows from five to seven feet tall and is one of the very finest of the smaller evergreens; especially good for cemetery use.

Pyramidal Arborvitae. *Thuya occidentalis pyramidalis* forms an elegant and very slender shaft of dark green—useful for producing columnar effects and superior to the Irish Juniper, familiar from its frequent use in cemeteries. This variety is one of the hardiest and can also be used in the formation of a very handsome ornamental hedge or screen.

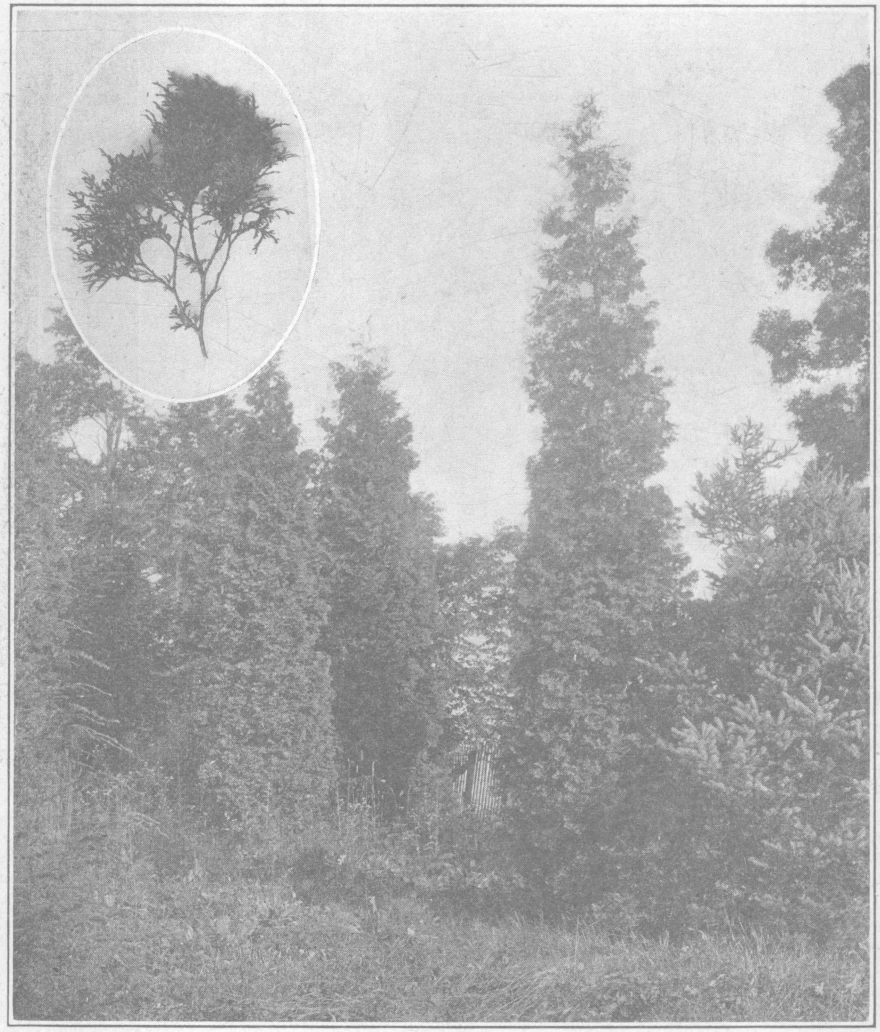

FIG. XIV—Pyramidal Arborvitae. *Thuya occidentalis pyramidalis* *Photo by Ballou.*

Lawson's Cypress. *Chamaecyparis Lawsoniana Murr.* One of the most pleasing evergreens in habit of growth is Lawson's cypress, a species from the Pacific coast, the lower part of whose branches curve upward like those of the spruce, while the extremities droop with the utmost grace. Of rapid growth, the tree is covered with bluish-green foliage singularly fern-like in character,

and specimens one hundred feet tall are not uncommon in their native home. Ths Lawson cypress is hardy in Ohio, excepting that the tips of twigs on young trees are occasionally winter-killed, This may be ascribed to their habit of sometimes making a vigorous growth in late summer or early autumn and the use of stimulating manures, or even excessively fertile soil, about them should be avoided. This species is one of the really excellent ornamental evergreens and is too seldom seen.

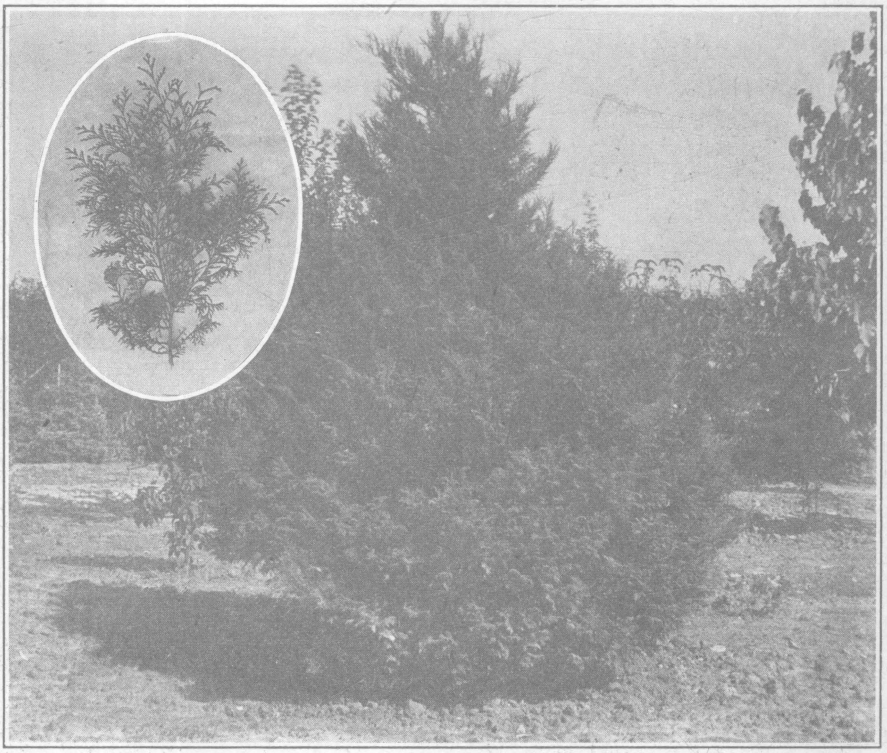

FIG. XV—Golden Plume-like Japan Cypress. *Retinospora plumosa aurea Hort.*

Japan Cypress. *Retinospora.* The Japan cypresses are an important group of elegant, small evergreens, in which are embodied a great diversity of color and texture in foliage as well as variety in type and outline of tree. In their numerous shades of green, blue and gold they afford some of the finest material for the formation of groups and beds of evergreens, and are unexcelled as miniature specimen trees. As grown for a number of years on the grounds of the Experiment Station they have satisfactorily withstood the rigors of our winters and are a source of perennial delight to all beholders. While their hardiness is assured, the age to which they will retain their youthful beauty and vigor is as yet undetermined, although it is claimed that in some localities they are short lived. They revel in a fertile soil, without which it is not easy to secure foliage of the best quality and color. In making a bed or group they may be planted four to six feet apart and will not crowd for a number of years. The botanical classification of the Japan cypresses is as yet considerably involved, but in this connection it will suffice to group them under four or five principal types, most of which have green and golden forms.

Pea-fruited Japan Cypress (*Cupressus pisifera Seib. & Zucc,*)is a graceful tree from the mountains of Japan. Its branchlets are covered wiih compressed or flattened foliage slightly resembling that of arborvitae, while the branches have a pendulous, feathery character which gives the tree a charming and desirable aspect. This is one of the largest and hardiest kinds.

Golden Pea-fruited Japan Cypress. *Cupressus pisifera aurea.* This variety has the form and general characteristics of the preceding one, with the exception that its foliage is of a golden yellow color. It is a popular sort, as the color of the new growth is very bright; one of the very finest and best of the golden evergreens.

Plume-like Japan Cypress. *Retinospora plumosa Hort.* In this we have one of the most valuable of the entire group. The tree is dense and compact in habit, its smaller branches being covered with a fluffy, plume-like green foliage, and forms a superb small specimen.

Golden Plume-like Japan Cypress. *Retinospora plumosa aurea Hort.* This variety is a sport from the plume-like Japan cypress and differs from it only in having golden foliage. When planted with the plume-like or other of the green sorts the entire group is lightened and brightened in a remarkable manner.

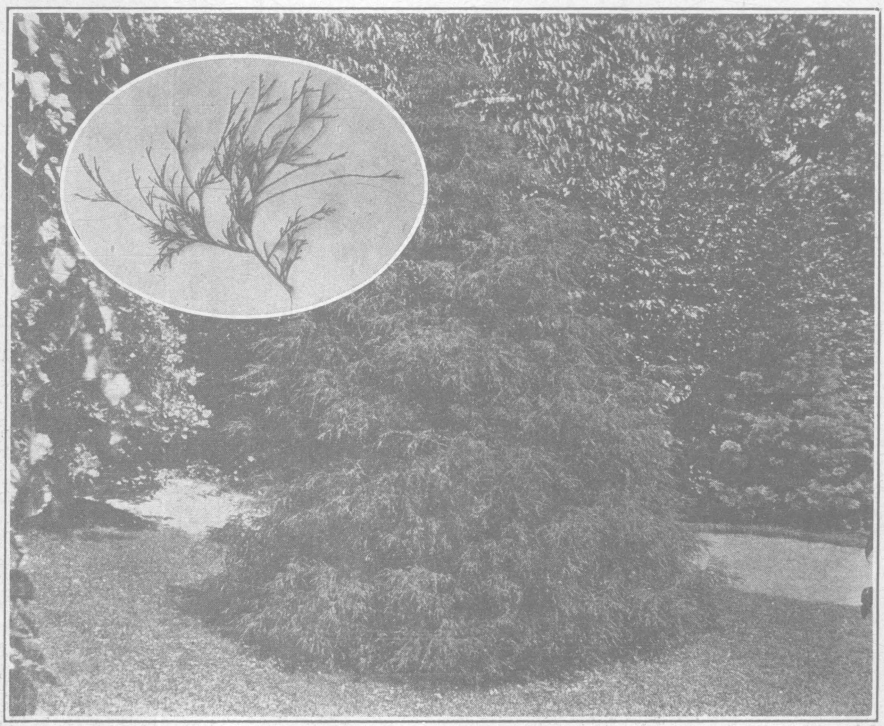

FIG. XVI—Thread-branched Japan Cypress. *Retinospora filifera Fowler.*

Squarrose-leaved Japan Cypress (*Retinospora squarrosa Hort.*) is a much-branched, bushy tree seldom more than five or six feet tall whose soft foliage is in color a silvery blue. The foliage is fragile and tender in appearance but is not often injured by cold. To preserve a conical shape it is necessary to shear this variety annually.

Thread-branched Japan Cypress (*Retinospora filifera Fowler*) is a unique form having peculiar, thread-like or whip-like branches, and seems to be one of the most vigorously constituted of the entire group. In time it becomes a bushy shrub or small tree from which stiffness and formality are wholly lacking. It should be used, even in very small collections, on account of its hardiness and vigorous habit of growth.

Golden Thread-branched Japan Cypress. *Retinospora filifera aurea.* In this we have the showy golden form of thread-branched Japan cypress. Its foliage is abundantly marked with yellow in a glowing tint, which is well retained through summer, even when the tree is grown in partial shade; a peculiar, distinct and valuable variety.

Obtuse-leaved Japan Cypress. *Cupressus obtusa Sieb. and Zucc.* By some this is regarded as the finest of all the Japan cypresses. In Japan, where it becomes a tree sixty feet tall, it is considered sacred and its wood is used in the construction of temples. The foliage is a clear, brilliant green in color and for ornamental purposes the value of the tree can scarcely be rated too high. As the tree acquires size it is apt to become open and thin, which can be obviated by annual shearing or pruning in its younger years to increase the number of branches.

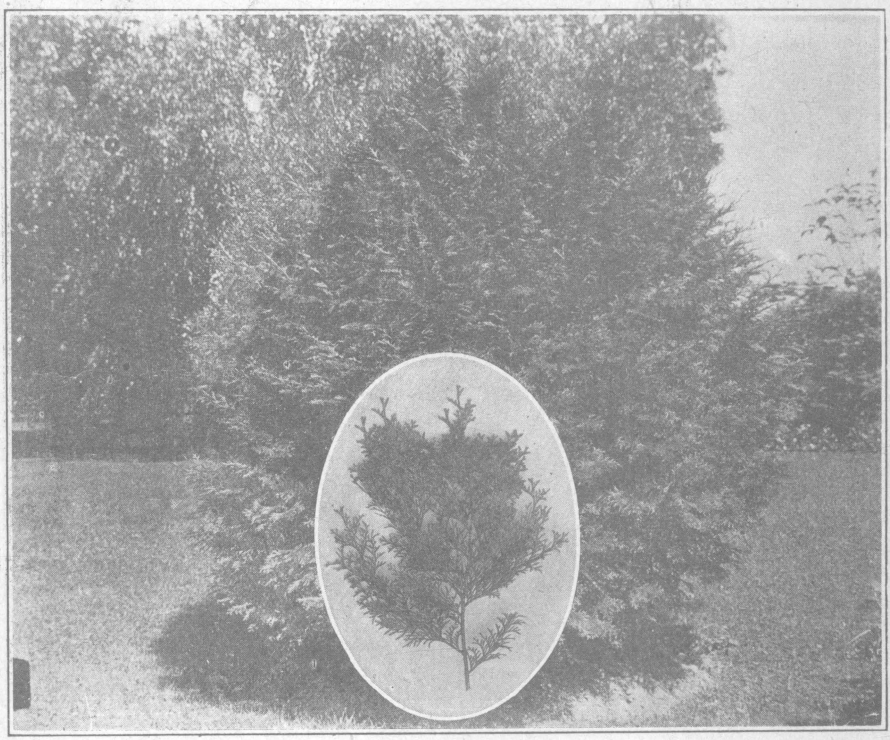

FIG. XVII—Graceful Obtuse-leaved Japan Cypress. *Cupressus obtusa gracilis.*

Compact obtuse-leaved Japan Cypress (*Cupressus obtusa compacta*) is a neat, dwarf, compact grower, which has foliage similar to the obtuse-leaved Japan cypress and is one of the very best of the small, low-growing evergreens.

Graceful obtuse-leaved Japan Cypress (*Cupressus obtusa gracilis*) is a form somewhat larger and taller than the preceding variety, but which makes a compact, symmetrical, small tree. Has the good foliage and color of obtusa and is sure to give satisfaction wherever planted.

Blue-tinted Red Cedar. *Juniperus Virginiana var. Glauca.* Blue-tinted red cedar is a variety of the red cedar, a native tree of Eastern North America whose habitat extends from southern Canada to Florida. Adult trees are of slim upright habit, ranging from fifty to seventy-five feet in height. Although the shearing and clipping of evergreens into artificial shapes is not encouraged, no tree is better suited to the purpose than is this variety, which is one of the very best kinds for making formal gardens. The red cedar will grow on gravelly upland and is equally at home in the moist, sandy soil of the sea shore.

English Yew. *Taxus baccata.* The Yew, famous because of its extensive use in English cemeteries, is a handsome, slow-growing tree, often forty feet tall, whose foliage somewhat resembles in color and texture that of the American hemlock. In England it attains an extraordinary age, there being some authenticated instances of trees having lived for a thousand years. Unfortunately, in this country the English Yew lacks vigor, is short-lived and altogether unsuited to extensive planting in Ohio. The very hardiest and best of the yews is the Japanese species (*Taxus cuspidata*), which is as yet quite rare but worthy of trial.

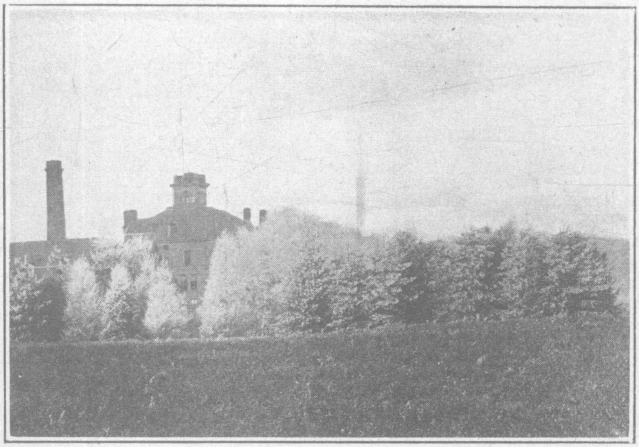

FIG. XVIII—Evergreens laden with frost. *Photo by Waid.*

SUMMARY.

Because of their enduring foliage, evergreens should be more extensively planted about country homes, whether used in straight-row windbreaks or mingled informally with other trees on the lawn. From the ornamental standpoint, they abound in rich, dark shades of green, equally valuable as a background for deciduous trees or flowering shrubs and plants.

The finest of the larger ornamental evergreens are the White Pine, Colorado Blue Spruce, White or Silver Fir, Oriental Spruce and American Hemlock. Of the smaller ones none is better than Siberian, Hovey's Golden, Pyramidal or Globe Arborvitae, Thread-branched Japan Cypress, Graceful Obtuse-leaved Japan Cypress and Plume-like Japan Cypress.

The best evergreens bearing foliage in shades of yellow are Geo, Peabody Arborvitae, Golden Pea-fruited Japan Cypress and Golden Plume-like Japan Cypress.

In making an evergreen hedge use American Hemlock or Siberian Arborvitae.

For specimens to be shorn into fanciful shapes, use common Red Cedar, Blue-tinted Cedar or any Arborvitae.

As a protection to farm buildings, the barn-yard, or poultry run, a good windbreak will repay its cost in a few years in the saving of fuel or feed.

The length of time consumed in its growth need not deter anyone from making a windbreak, as results may be secured in half a dozen years by planting thickly, subsequent thinning to be practiced.

For the construction of windbreaks and shelter belts the White Pine, Norway Spruce, Austrian and Scotch Pines and American Arborvitae have no superiors. These kinds all grow rapidly and are not lacking in vigor or adaptability to thin soils, exposed situations and other adverse conditions.

It is hoped that no reader will so misconstrue any part of this publication as to plan evergreens exclusively about the home. Deciduous trees occupy a place in any scheme for beautifying lawns which conifers alone do not and cannot fill. When surrounded and completely enveloped in a dense growth of evergreens, a style of planting somewhat prevalent a few decades ago and of which examples are even now occasionally seen, a residence becomes dark, gloomy, damp and dangerous to health.